

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:	W. Thomas Cathey, Jr. et al.		
Application No.:	Unknown	Group No.:	Unknown
Filed:	(Herewith)	Examiner:	Unknown
		Atty. Docket No.:	414671

For: EXTENDED DEPTH OF FIELD OPTICAL SYSTEMS

**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**


**INFORMATION DISCLOSURE STATEMENT TRANSMITTAL**  
**FILED UNDER 37 C.F.R. § 1.97(B)**

Pursuant to 37 C.F.R. §§ 1.56, 1.97(b) and (e) and 1.98, Applicants hereby submit an Information Disclosure Statement Form PTO-1449 (modified). The cited references were previously considered in prosecution of prior U.S. Application Serial Number 09/070,969, filed 01 May 1998, of which the above-referenced application is a continuation. Copies of the references should thus be obtained in the prior application pursuant to 37 C.F.R. §1.98(d).

Applicants believe no fees are currently due. However, should any additional fees be required in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge said fees to Deposit Account No. 12-0600.

Respectfully submitted,

Date: 4/16/04

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STATEMENT BY APPLICANT**

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Sheet 1 of 7

**Complete if Known**

Application Number	Unknown
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First Named Inventor	W. Thomas Cathey, Jr.
Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	414671

**U.S. PATENT DOCUMENTS**

Examiner Initials *	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code <sup>2</sup> (if known)			
	1	2,959,105	11-08-1960	Sayanagi	
	2.	3,054,898	09-18-1962	Westover et al.	
	3.	3,305,294	02-21-1967	Alvarez	
	4.	3,583,790	06-08-1971	Baker	
	5	3,856,400	12-24-1974	Hartmann et al.	
	6	3,873,958	03-25-1975	Whitehouse	
	7	4,062,619	12-13-1977	Hoffman	
	8	4,082,431	04-04-1978	Ward III	
	9	4,174,885	11-20-1979	Joseph et al.	
	10	4,178,090	12-11-1979	Marks et al.	
	11	4,255,014	03-10-1981	Ellis	
	12	4,275,454	06-23-1981	Klooster Jr.	
	13	4,276,620	06-30-1981	Kahn et al.	
	14	4,308,521	12-29-1981	Casasent et al.	
	15	4,349,277	09-14-1982	Mundy et al.	
	16	4,466,067	08-14-1984	Fontana	
	17	4,480,896	11-06-1984	Kubo et al.	
	18	4,573,191	02-25-1986	Kidode et al.	
	19	4,575,193	03-11-1986	Greivenkamp Jr.	
	20	4,580,882	04-08-1986	Nuchman et al.	
	21	4,589,770	05-20-1986	Jones et al.	
	22	4,642,112	02-10-1987	Freeman	
	23	4,650,292	03-17-1987	Baker et al.	
	24	4,725,881	02-16-1988	Buchwald	
	25	4,734,702	03-29-1988	Kaplan	
	26	4,794,550	12-27-1988	Greivenkamp Jr.	
	27	4,825,263	04-25-1989	Desjardins et al.	
	28	4,827,125	05-02-1989	Goldstein	
	29	4,843,631	06-27-1989	Steinpicler et al.	
	30	4,936,661	06-26-1990	Betensky et al.	
	31	4,964,707	10-23-1990	Hayashi	
	32	4,989,959	02-05-1991	Plummer	
	33	5,003,166	03-26-1991	Girod	
	34	5,076,687	12-31-1991	Adelson	
	35	5,102,223	04-07-1992	Uesugi et al.	
	36	5,128,874	07-07-1992	Bhanu et al.	
	37	5,142,413	08-25-1992	Kelly	
	38	5,165,063	11-17-1992	Strater et al.	

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	39	5,193,124	03-09-1993	Subbarao	
	40	5,243,351	09-07-1993	Rafanelli et al.	
	41	5,248,876	09-28-1993	Kerstens et al.	
	42	5,270,825	12-14-1993	Takasugi et al.	
	43	5,270,861	12-14-1993	Estelle	
	44	5,270,867	12-14-1993	Estelle	
	45	5,280,388	01-18-1994	Okayama	
	46	5,299,275	03-29-1994	Jackson et al.	
	47	5,301,241	04-05-1994	Kirk	
	48	5,307,175	04-26-1994	Seachman	
	49	5,317,394	05-31-1994	Hale et al.	
	50	5,337,181	08-09-1994	Kelly	
	51	5,426,521	06-20-1995	Chen et al.	
	52	5,438,366	08-01-1995	Jackson et al.	
	53	5,442,394	08-15-1995	Lee	
	54	5,444,574	08-22-1995	Ono et al.	
	55	5,465,147	11-07-1995	Swanson	
	56	5,473,473	12-05-1995	Estelle et al.	
	57	5,476,515	12-19-1995	Kelman et al.	
	58	5,521,695	05-28-1996	Cathey Jr. et al.	
	59	5,532,742	07-02-1996	Kusaka et al.	
	60	5,555,129	09-10-1996	Konno et al.	
	61	5,565,668	10-15-1996	Reddersen et al.	
	62	5,568,197	10-22-1996	Hamano	
	63	5,572,359	11-05-1996	Otaki et al.	
	64	5,610,684	03-11-1997	Shiraishi	
	65	5,640,206	06-17-1997	Kinoshita et al.	
	66	5,706,139	01-06-1998	Kelly	
	67	5,751,475	05-12-1998	Ishiwata et al.	
	68	5,969,853	10-19-1999	Takaoka	
	69	5,969,855	10-19-1999	Ishiwata et al.	
	70	6,021,005	02-01-2000	Cathey Jr. et al.	
	71	6,025,873	02-15-2000	Nishioka et al.	
	72	6,034,814	03-07-2000	Otaki	
	73	6,037,579	03-14-2000	Chan et al.	
	74	6,069,738	05-30-2000	Cathey Jr. et al.	
	75	6,091,548	07-18-2000	Chen	
	76	6,097,856	08-01-2000	Hammond Jr.	

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Sheet 3 of 7

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		Number - Kind Code <sup>2</sup> (if known)			
	77	6,121,603	09-19-2000	Hang et al.	
	78	6,128,127	10-03-2000	Kusaka	
	79	6,144,493	11-07-2000	Okuyama et al.	
	80	6,172,723	01-09-2001	Inoue et al.	
	81	6,172,799	01-09-2001	Raj	
	82	6,208,451	03-27-2001	Itoh	
	83	6,218,679	04-17-2001	Takahara et al.	
	84	6,219,113	04-17-2001	Takahara	
	85	6,248,988	06-19-2001	Krantz	
	86	6,285,345	09-04-2001	Crossland et al.	
	87	6,288,382	09-11-2001	Ishihara	
	88	6,337,472	01-08-2002	Garner et al.	
	89	5,260,727	11-09-1993	Eisner et al.	
	90	4,655,565	04-07-1987	Freeman	

**FOREIGN PATENT DOCUMENTS**

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		Country Code <sup>3</sup> - Number <sup>4</sup> - Kind Code <sup>5</sup> (if known)				
	1	EPO-0759573-A2	02-26-1997	Eastman Kodak Company		
	2	EPO-0531926-B1	3-17-1993	Matsushita Electric Industrial Co., Ltd.		
	3	EPO-0981245-A2	2-23-2000	Canon Kabushiki Kaisha		
	4	EPO-0618473-A2	10-5-1994	Kuraray Co., Ltd.		
	5	EPO-0584769-B1	3-2-1994	Matsushita Electric Industrial Co., Ltd.		
	6	EPO-0791846-A2	8-27-1997	Canon Kabushiki Kaisha		
	7	UK-2278750-A	12-7-1994	Motion Media Technology Limited		
	8	EP-0742466-A	11-13-1996	Johnson & Johnson Vision		

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W. Thomas Cathey, Jr.

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**NON PATENT LITERATURE DOCUMENTS**

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	1	J. OJEDA-CASTANEDA, L. R. BERRIEL-VALDOS, and E. MONTES, "Spatial filter for increasing the depth of focus", Optics Letters, Vol. 10, No. 11, p520-522, November, 1985	
	2	J. OJEDA-CASTANEDA, and A. DIAZ, "High focal depth by quasibifocus", Vol. 27, No. 20, p4163-4165, October 15, 1988	
	3	W. CHI and N. GEORGE, "Electronic imaging using a logarithmic asphere", Optics Letters, Vol. 26, No., 12, p 875-877, June 15, 2001	
	4	J. OJEDA-CASTANEDA, E. TEPICHIN, and A. PONS, "Apodization of annular apertures: Strehl ratio", Applied Optics, Vol. 27, No. 24, p 5140-5145, December 15, 1988	
	5	D. L. MARKS, R. A. STACK, D. J. BRADY, and J. VAN DER GRACHT, "Three-dimensional tomography using a cubic-phase plate extended depth-of-field system", Optics Letters, Vol. 24, No. 4, p 253-255, February 15, 1999	
	6	S. C. TUCKER, W. T. CATHEY, and E. R. DOWSKI, Jr, "Extended depth of field and aberration control for inexpensive digital microscope systems", Optics Express, Vol. 4, No. 11, p467-474, May 24, 1999	
	7	H. BARTELT, J. OJEDA-CASTANEDA, and E. E. SICRE, "Misfocus tolerance seen by simple inspection of the ambiguity function", Applied Optics, Vol 23, No. 16, p 2693-2696, August 15, 1984	
	8	J. OJEDA-CASTANEDA, L. R. BERRIEL-VALDOS, and E. MONTES, "Ambiguity function as a design tool for high focal depth", Applied Optics, Vol 27, No. 4, p 790-795, February 15, 1988	
	9	J. OJEDA-CASTANEDA, P. ANDRES, and A. DIAZ, "Annular apodizers for low sensitivity to defocus and to spherical aberration", Optics Letters, Vol. 11, No. 8, p 487-489, August, 1986	
	10	J. OJEDA-CASTANEDA, E. TEPICHIN, and A. DIAZ, "Arbitrarily high focal depth with a quasioptimum real and positive transmittance apodizer", Applied Optics, Vol 28, No. 13, p 2666-2670, July 1, 1989	
	11	J. OJEDA-CASTANEDA, and L. R. BERRIEL-VALDOS, "Arbitrarily high focal depth with finite apertures", Optics Letters, Vol. 13, No. 3, p 183-185, March, 1988	
	12	G. INDEBETOUW, AND H. BAI, "Imaging with Fresnel zone pupil masks: extended depth of field", Applied Optics, Vol 23, No. 23, p 4299-4302, December 1, 1984	
	13	W. T. WELFORD, "Use of annular apertures to increase focal depth", Journal of the Optical Society of America, Vol. 50, No. 8, p 749-753, August, 1960	
	14	C. VARAMIT, and G. INDEBETOUW, "Imaging properties of defocused partitioned pupils", J. Opt. Soc. Am. A, Vol. 2, No. 6, p 799-802, June 1985	
	15	E. R. DOWSKI Jr., and W. T. CATHEY, "Single lens single-image incoherent passive-ranging systems", Applied Optics, Vol 33, No. 29, p 6762-6773, October 10, 1994	

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	16	W. T. CATHEY, B. R. FRIEDEN, W. T. RHODES, and C. K. RUSHFORTH, "Image gathering and processing for enhanced resolution", J. Opt. Soc. Am. A, Vol. 1, No. 3, p 241-250, March 1984	
	17	J. VAN DER GRACHT, E. R. DOWSKI Jr., M. G. TAYLOR, and D. M. DEEVER, "Broadband behavior of an optical-digital focus-invariant system", Optics Letters, Vol. 21, No. 13, p 919-921, July 1, 1996	
	18	G. HAUSLER, "A method to increase the depth of focus by two step image processing", Optical Communications, Vol. 6, No. 1, p 38-42, September, 1972	
	19	C. J. COGSWELL, N. I. SMITH, K. G. LARKIN, and P. HARIHARAN, "Quantitative DIC microscopy using a geometric phase shifter", SPIE, Vol. 2984, p72-81, 1997	
	20	H. WANG, and F. GAN, "High focal depth with a pure-phase apodizer", Applied Optics, Vol 40, No. 31, p 5658-5662, November 1, 2001	
	21	H. WANG, and F. GAN, "Phase-shifting apodizers for increasing focal depth", Applied Optics, Vol 41, No. 25, p 5263-5266, September 1, 2002	
	22	S. S. SHERIF, E. R. DOWSKI, Jr and W. T. CATHEY, "A logarithmic phase filter to extend the depth of field of incoherent hybrid imaging systems", Applied Optics, in press.	
	23	D. KERMISCH, "Partially coherent image processing by laser scanning", Journal of the Optical Society of America, Vol. 65, No. 8, p 887-891, August, 1975	
	24	R. J. PIEPER and A. KORPEL, "Image processing for extended depth of field", Applied Optics, Vol 22, No. 10, p 1449-1453, May 15, 1983	
	25	G. E. JOHNSON, E. R. DOWSKI, Jr, and W. T. CATHEY, "Passive ranging through wave-front coding: information and application", Applied Optics, Vol 39, No. 11, p 1700-1710, April 10, 2000	
	26	G. Y. SIRAT, "Conoscopic holography. I. Basic principles and physical basis", J. Opt. Soc. Am. A, Vol. 9, No. 1, p 70-90, January 1992	
	27	E. R. DOWSKI, Jr, and W. T. CATHEY, "Extended depth of field through wave-front coding", Applied Optics, Vol 34, No. 11, p 1859-1866, April 10, 1995	
	28	H. B. WACH, E. R. DOWSKI, Jr., and W. T. CATHEY, "Control of chromatic focal shift through wave-front coding", Applied Optics, Vol 37, No. 23, p 5359-5367, August 10, 1998	
	29	D. KERMISCH, "Principle of equivalence between scanning and conventional optical imaging systems", J. Opt. Soc. Am. Vol. 67, No. 10, p 1357-1360, October, 1977	
	30	J. OJEDA-CASTANEDA, R. RAMOS and A. NOYOLA-ISGLEAS, "High focal depth by apodization and digital restoration", Applied Optics, Vol 27, No. 12, p 2583-2586, June 15, 1988	
	31	J. OJEDA-CASTANEDA, and L. R. BERRIEL-VALDOS, "Zone plate for arbitrarily high focal depth", Applied Optics, Vol 29, No. 7, p 994-997, March 1, 1990	
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(Herewith)

First Named Inventor

W. Thomas Cathey, Jr.

Art Unit

Unknown

Examiner Name

Unknown

Attorney Docket Number

414671

**NON PATENT LITERATURE DOCUMENTS**

Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
	32	J.T. MCCRICKERD, "Coherent processing and depth of focus of annular aperture imagery", Applied Optics, Vol. 10, No. 10, p2226-2230, October, 1971	
	33	M.MINO and Y. OKANO, "Improvement in the OTF of a defocused optical system through the use of shade apertures", Applied Optics, Vol. 10, No. 10, p2219-2225, October, 1971	
	34	S. KUBO, M. INUI, and Y. MIYAKE, "Preferred sharpness of photographic color images", Journal of Imaging Science, Vol. 29, No. 6, p213-215, Nov./Dec. 1985	
	35	C. J. COGSWELL and C. J. R. SHEPPARD, "Confocal differential interference contrast (DIC) microscopy: including a theoretical analysis of conventional and confocal DIC imaging", Journal of Microscopy, Vol. 165, part 1, p 81-101, January, 1992	
	36	J. M. SCHMITT, S. L. LEE and K. M. YUNG, "An optical coherence microscope with enhanced resolving power in thick tissue", Optics Communications, Vol. 142, p 203-207, October 15, 1997	
	37	K. J. BARNARD, E. A. WATSON AND P. F. MCMANAMON, "Nonmechanical microscanning using optical space-fed phased arrays", Optical Engineering, Vol. 33, No. 9, p 3063-3071, September, 1994	
	38	W. T. CATHEY and W. C. DAVIS, "Imaging system with range to each pixel", J Opt. Soc. Am A, Vol. 3, No. 9, p1537-1542, September, 1986	
	39	J. E. GREIVENKAMP, "Color dependent optical prefilter for the suppression of aliasing artifacts", Applied Optics, Vol 29, No. 5, p 676-684, February 10, 1990	
	40	J. T. MCCRICKERD, "Coherent processing and depth of focus of annular aperture imagery", Applied Optics, Vol 10, No. 10, p 2226-2230, October, 1971	
	41	M. KAWAKITA, K. IIZUKA, T. AIDA, H. KIKUCHI, H. FUJIKAKE, J. YONAI and K. TAKIZAWA, "Axi-version camera: a three-dimension camera", In Three-dimensional Image Capture and Applications III, Brian D. Comer, Joseph H. Nurre, Editors, Proceedings of SPIE, Vol 3958, p 61-70, 2000	
	42	C. WUUST and D. W. CAPSON, "Surface profile measurement using color fringe projection", Machine Vision and Applications, Vol. 4, p 193-203, 1991	
	43	S. V. SHATALIN, J. B. TAN, R. JUSKAITIS and T. WILSON, "Polarization contrast imaging of thin films in scanning microscopy", Optics Communications, Vol. 116, p 291-299, May 1, 1995	
	44	T. FUKANO, "Geometrical cross-sectional imaging by a heterodyne wavelength-scanning interference confocal microscope", Optics Letters, Vol. 25, No. 8, p 548-550, April 15, 2000	
	45	Q-S. CHEN and M. S. WEINHOUS, "Sub-pixel shift with fourier transformation to achieve efficient and high quality image interpolation", SPIE, Vol. 2, No. 3661, p 728-736, February 1999	
	46	H. WEI, and T. D. BINNIE, "High-resolution image reconstruction for multiple low-resolution images", 7th International Conference on Image Processing and Its Applications, Pub. # 465, vol 2 p596-600 (1999)	
	47	G. HAUSLER, and E. KORNER, "Imaging with expanded depth of focus", Zeiss Inform, Oberkochen, 29, No. 98E, p 9-13 (1986/1987)	
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		Application Number	Unknown
		Filing Date	(Herewith)
		First Named Inventor	W. Thomas Cathey, Jr.
		Art Unit	Unknown
		Examiner Name	Unknown
Sheet 7 of 7	Attorney Docket Number	414671	

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	48	SIEBERT, J. (Officer), International Search Report received in PCT/US01/26126, international filing date 08-20-2001, Completion Date 24 June 2003, 3 pages.S	
	49	VELDKAMP, WILFRID B., and McHUGH, THOMAS J., "Binary Optics", Scientific American, 1 May 1992, vol. 266, no. 5, pages 50-55	
	50	O'SHEA, DONALD C. and HARRIGAN, MICHAEL E., "Chapter 33, Aberration Curves in Lens Design", Handbook of Optics, Volume 1, 1995, pages 33.1-33.5, McGraw-Hill, New York	
	51	Abstract of JP 60247611 A, published 12 July 1985 (Toshiba KK), Patent Abstracts of Japan, 6 May 1986, vol. 010, no. 119 (p-435), 1 page	
	52	SIEBERT, J. (Officer), International Search Report received in PCT/US01/26126, international filing date 08-20-2001, Completion Date 24 June 2003, 3 pages.S	
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	54	O'SHEA, DONALD C. and HARRIGAN, MICHAEL E., "Chapter 33, Aberration Curves in Lens Design", Handbook of Optics, Volume 1, 1995, pages 33.1-33.5, McGraw-Hill, New York	
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